## CLAIMS

We claim:

1. A method of generating a partial procedure summary of a procedure of multithreaded software, wherein the procedure performs a plurality of actions when executed, the method comprising:

identifying a plurality of the actions as atomically modelable with respect to multithreaded execution of the procedure; and

generating the partial procedure summary of the procedure from the plurality of the actions atomically modelable with respect to multithreaded execution of the multithreaded software.

2. One or more computer-readable media having computer-executable instructions for performing the method of claim 1.

3. The method of claim 1 further comprising:

modeling execution of the software via the partial procedure summary.

4. The method of claim 3 further comprising:

during modeling, comparing an indicated state invariant with a modeled state; and

responsive to determining the modeled state fails the indicated state invariant, indicating that a programming flaw is present in the software.

5. The method of claim 1 further comprising:

associating an initial location and a resulting location within the procedure with the partial procedure summary.

6. The method of claim 1 further comprising:

performing a reachability analysis of the software; and

consulting a procedure summary comprising the partial procedure summary when the procedure is encountered during the reachability analysis.

7. The method of claim 1 wherein the identifying comprises identifying a transaction boundary within the actions.

8. The method of claim 1 wherein the identifying comprises identifying at least one of the plurality of actions as movable later in time with respect to actions executed by other threads without affecting a resulting end state.

9. The method of claim 1 wherein the identifying comprises identifying a sequence of actions having zero or more right movers followed by an atomic action followed by zero or more left movers.

10. The method of claim 1 wherein the plurality of actions atomically modelable with respect to multithreaded execution of the software is a proper subset of the plurality of actions of the procedure.

11. A method of modeling multithreaded software, the method comprising:

evaluating actions of the multithreaded software; and

based on the evaluating, generating a plurality of procedure summaries for the multithreaded software;

wherein the procedure summaries model states of the multithreaded software for multithreaded execution of the multithreaded software.

12. The method of claim 11 wherein at least one of the procedure summaries comprises at least two or more partial procedure summaries summarizing a procedure.

13. The method of claim 11 wherein at least one of the procedure summaries comprises at least one partial procedure summary for a procedure, wherein the partial procedure summary summarizes less than all of the procedure.

14. The method of claim 11 wherein the evaluating comprises:

identifying a series of transactions within the multithreaded software; and

modeling the transactions via partial procedure summaries.

15. A system for modeling multithreaded software, the system comprising:

a model checker operable to analyze a model of the multithreaded software, the model checker comprising:

a model of the software, wherein the model comprises a plurality of procedure summaries modeling states of the software during multithreaded execution of the multithreaded software.

16. The system of claim 15 wherein at least one of the procedure summaries comprises a procedure summary summarizing actions deemed to have occurred one after another without interruption.

17. The system of claim 15 wherein the model checker further comprises:

a reachability analyzer operable to employ the procedure summaries to generate modeled states of the software.

18. The system of claim 17 wherein the system is operable to detect programming flaws via comparing an indicated state invariant with the modeled states.

19. One or more computer-readable media having encoded thereon a data structure comprising:

a plurality of state pairs representing a procedure summary for multithreaded software, wherein at least one of the state pairs comprises an initial state and a resulting state indicating a state after execution of actions modeled by the procedure summary, wherein the procedure summary models multithreaded execution of the multithreaded software.

20. The one or more computer-readable media of claim 19 wherein the state pairs comprise the following:

an indication of a first location within the procedure and an indication of a possible state for one or more variables of the multithreaded software when the procedure has reached the first location; and

an indication of a second location within the procedure and an indication of a resulting state for the one or more variables of the multithreaded software after a plurality of summarized actions of the procedure have been executed, wherein the summarized actions start at the first location and end at the second location;

wherein the plurality of summarized actions of the procedure are atomically modelable with respect to multithreaded execution of the multithreaded software.